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10/626,845	07/23/2003	Mohammed Javed Absar	851663.452	9283

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EXAMINER	
ALBERTALLI, BRIAN LOUIS	
ART UNIT	**PAPER NUMBER**
2626	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/626,845	Applicant(s) ABSAR ET AL.
	Examiner Brian L. Albertalli	Art Unit 2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5)☐ Claim(s) ____ is/are allowed.

6)☒ Claim(s) 1,3,5-20 and 23-27 is/are rejected.

7)☒ Claim(s) 2,4,21 and 22 is/are objected to.

8)☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on ____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Singapore on 23 July 2002. It is noted, however, that applicant has not filed a certified copy of the 200204487-3 application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 12, 17, 19, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Purnhagen et al. (*Object-Based Analysis/Synthesis Audio Coder for Very Low Bit Rates*).

In regard to claim 12, Purnhagen et al. disclose a decoder, the decoder comprising:

means for extracting a set of frequency values V for N largest frequency components from an encoded transient audio signal, where N is a predetermined number (frequency values are decoded, page 7, section 6, 2nd paragraph; the decoded values based on the coding values, which are a set of V frequency values for N largest

frequency components, page 5, section 4.1, 2nd paragraph, and page 6, section 5, 3rd paragraph); and

means for extracting an approximate envelope from the encoded transient audio signal (the amplitude envelope is reconstructed, page 7, section 6, 2nd paragraph).

In regard to claim 17, Purnhagen et al. disclose a signal encoder (Fig. 2), the encoder comprising:

a sinusoidal component estimator for estimating a set of values V for a number N of sinusoidal components of a signal (a set of frequency parameters, e.g. 10 to 20, above a masked threshold M(f) are determined, page 5, section 4.1, 2nd paragraph, and page 6, section 5, 3rd paragraph);

a sinusoidal component quantifier coupled to the sinusoidal component estimator (parameter quantization, page 6, section 5, 1st paragraph);

a signal envelope estimator for generating an estimated signal envelope of the signal and a set of values W for a number P of samples of the estimated signal envelope (three parameters describe the amplitudes 0, 1, and 0, page 5, section 4.1, 3rd paragraph, and Fig. 5);

a signal envelope quantifier coupled to the signal envelope parameter estimator (parameter quantization, page 6, section 5, 1st paragraph); and

a multiplexer coupled to the sinusoidal component quantifier and the signal envelope quantifier for generating an encoded data stream, the encoded data stream including the values V and W (Fig. 2, mux; sinusoid parameters and envelope

parameters are quantized and transmitted through the multiplexer, page 6, section 5, 2nd paragraph).

In regard to claim 19, Purnhagen et al. disclose a system for transmitting a signal, the system comprising:

an encoder (Fig. 2) that includes:

a sinusoidal component estimator for estimating a set of values V for a number N of sinusoidal components of the signal (a set of frequency parameters, e.g. 10 to 20, above a masked threshold M(f) are determined, page 5, section 4.1, 2nd paragraph, and page 6, section 5, 3rd paragraph);

a sinusoidal component quantifier coupled to the sinusoidal component estimator (parameter quantization, page 6, section 5, 1st paragraph);

a signal envelope estimator for generating an estimated signal envelope and a set of values W for a number P of samples of the estimated signal envelope (three parameters describe the amplitudes 0, 1, and 0, page 5, section 4.1, 3rd paragraph, and Fig. 5);

a signal envelope quantifier coupled to the signal envelope parameter estimator (parameter quantization, page 6, section 5, 1st paragraph); and

a multiplexer coupled to the sinusoidal component quantifier and the signal envelope quantifier for generating an encoded data stream, the encoded data stream including the sets of values V and W (Fig. 2, mux; sinusoid parameters and envelope

parameters are quantized and transmitted through the multiplexer, page 6, section 5, 2nd paragraph); and

a decoder (Fig. 3) that includes:

a demultiplexer for demultiplexing the encoded data stream (demux, page 7, section 6, 1st paragraph);

a sinusoidal component decoder for generating a reconstructed sinusoidal component of a decoded signal using the set of values V and the number N (frequency values are decoded, page 7, section 6, 2nd paragraph; the decoded values based on the coding values, which are a set of V frequency values for N largest frequency components, page 5, section 4.1, 2nd paragraph, and page 6, section 5, 3rd paragraph);

a signal envelope reconstruction module for generating a reconstructed signal envelope for the decoded signal using the set of values W and the number P (the amplitude envelope is reconstructed, page 7, section 6, 2nd paragraph); and a

recomposition module coupled to the sinusoidal component decoder and the signal envelope reconstruction module for generating a decoded signal (additive block combines all signals, see Fig. 3).

In regard to claim 20, Purnhagen et al. disclose a method of encoding a signal, the method comprising:

(a) determining a set of frequency values V for N frequency components of the signal, where N is a predetermined number (a set of frequency parameters, e.g. 10 to

20, above a masked threshold M(f) are determined, page 5, section 4.1, 2nd paragraph, and page 6, section 5, 3rd paragraph);

(b) determining an approximate envelope of the signal (an approximated envelope is determined, page 5, section 4.1, 3rd paragraph); and

(c) determining a predetermined number P of amplitude values W of samples of the approximate envelope (three parameters describe the amplitudes 0, 1, and 0, page 5, section 4.1, 3rd paragraph, and Fig. 5).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3, 5, 7, 8, 11, 13, 15, 16, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Purnhagen et al., in view of Wang (U.S. Patent 5,665,928).

In regard to claims 1 and 16, Purnhagen et al. disclose a method and system for parametrically encoding a transient audio signal, the method/system comprising steps/means for:

(a) determining a set of frequency values V for N frequency components of the signal, where N is a predetermined number (a set of frequency parameters, e.g. 10 to

20, above a masked threshold M(f) are determined, page 5, section 4.1, 2nd paragraph, and page 6, section 5, 3rd paragraph);

(b) determining an approximate envelope of the signal (an approximated envelope is determined, page 5, section 4.1, 3rd paragraph); and

(c) determining a predetermined number P of amplitude values W of samples of the approximate envelope (three parameters describe the amplitudes 0, 1, and 0, page 5, section 4.1, 3rd paragraph, and Fig. 5);

whereby a parametric representation of the transient audio signal is given by parameters including V, N, P and W, such that a decoder receiving the parametric representation can reproduce a decoder approximation of the transient audio signal (the various parameters are quantized and transmitted, page 6, section 5; such that a decoder can approximate the transient audio signal, page 7, section 6).

Purnhagen et al. do not disclose that the P amplitude values of the approximate envelope are used in generating a spline approximation of the approximate envelope.

Wang discloses a method for generating sounds using P amplitude values of an approximated envelope (target values), P amplitude values are used in generating a spline approximation of the approximate envelope (target values are provided to a coefficient calculator to determine a spline for the envelope of a signal, column 5, lines 29-41, column 3, line 62 to column 4, line 5; and Fig. 3).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Purnhagen et al. to use the P amplitude values to generate a spline approximation of the approximate envelope, because a spline approximation reduces

the noisy effects caused by using a simple linear envelope approximation, as taught by Wang (column 1, line 31 to column 2, line 7).

In regard to claim 3, Purnhagen et al. disclose transmitting the parametric representation of the transient audio signal via a communication medium (transmitting model parameters, page 6, section 5, 1st paragraph).

In regard to claim 5, Purnhagen et al. disclose N is determined according to a bit rate of an audio encoder performing the method (the number of parameters depends on the bit rate, page 6, section 5, 3rd paragraph).

In regard to claims 7 and 24, Purnhagen et al. disclose determining an interval, I, of the transient audio signal and wherein the parameters of the parametric representation further include the interval I (parameters are determined on a frame basis, a frame representing an interval of the audio signal, page 4, section 4, 1st paragraph).

In regard to claims 8 and 25, Purnhagen et al. disclose the samples W are equally spaced in time over the interval I (see page 14, Fig. 5, the horizontal axis represents the W samples for a frame, which are "equally spaced", i.e. the sampling rate is constant).

In regard to claim 11, Purnhagen et al. disclose an encoder, the encoder comprising:

means for determining a set of frequency values V for N largest frequency components of a transient audio signal, where N is a predetermined number (a set of frequency parameters, e.g. 10 to 20, above a masked threshold M(f) are determined, page 5, section 4.1, 2nd paragraph, and page 6, section 5, 3rd paragraph);

means for determining an approximate envelope of the transient audio signal (an approximated envelope is determined, page 5, section 4.1, 3rd paragraph); and

means for determining a predetermined number P of amplitude values W of samples of the approximate envelope (three parameters describe the amplitudes 0, 1, and 0, page 5, section 4.1, 3rd paragraph, and Fig. 5).

Purnhagen et al. do not disclose that the P amplitude values of the approximate envelope are used in generating a spline approximation of the approximate envelope.

Wang discloses a method for generating sounds using P amplitude values of an approximated envelope (target values), P amplitude values are used in generating a spline approximation of the approximate envelope (target values are provided to a coefficient calculator to determine a spline for the envelope of a signal, column 5, lines 29-41, column 3, line 62 to column 4, line 5; and Fig. 3).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Purnhagen et al. to use the P amplitude values to generate a spline approximation of the approximate envelope, because a spline approximation reduces

the noisy effects caused by using a simple linear envelope approximation, as taught by Wang (column 1, line 31 to column 2, line 7).

In regard to claims 13 and 15, Purnhagen et al. disclose a method and decoder for decoding a parametrically encoded signal, the method/decoder comprising steps/means for:

(a) receiving a parametric representation of the signal, the parametric representation including a set of frequency values V for a predetermined number N frequency components of the signal and a set of amplitude values W (frequency and amplitude parameters are decoded, page 7, section 6, 1st and 2nd paragraph); and

(b) reproducing a decoder approximation of the encoded signal according to the parametric representation by:

1) generating a sinusoidal signal by combining the set of frequency values V of the N frequency components of the transient audio signal (the subset of, e.g. 10 to 20 sinusoids, transmitted out of N frequency components are synthesized, page 7, section 6, 2nd paragraph);

2) generating an envelope approximation using an envelope function and the set of amplitude values W (the amplitude envelope is reconstructed, page 7, section 6, 2nd paragraph); and

3) applying the envelope approximation to the sinusoidal signal (the envelope is multiplied with t he synthesized sinusoid, page 7, section 6, 2nd paragraph).

Purnhagen et al. do not disclose the envelope approximation is a spline interpolation.

Wang discloses a method for generating sounds using P amplitude values of an approximated envelope (target values), P amplitude values are used in generating a spline approximation of the approximate envelope (target values are provided to a coefficient calculator to determine a spline for the envelope of a signal, column 5, lines 29-41, column 3, line 62 to column 4, line 5; and Fig. 3).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Purnhagen et al. to use the P amplitude values to generate a spline approximation of the approximate envelope, because a spline approximation reduces the noisy effects caused by using a simple linear envelope approximation, as taught by Wang (column 1, line 31 to column 2, line 7).

6. Claims 6 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Purnhagen et al., in view of Wang, and further in view of Oppenheim et al. (*Discrete Time Signal Processing*).

In regard to claim 6 and 23, Purnhagen et al. disclose determining a set of frequency components of the transient audio signal (frequency model parameters), and

selecting N largest frequency components of the set of determined frequency components (the N frequency components having the highest level above a masking threshold are selected, page 5, section 4.1, 2nd paragraph).

Purnhagen et al. and Wang do not specifically disclose the frequency transformation is a Fast Fourier Transform (FFT).

Oppenheim discloses a method for determining a set of frequency components by performing an FFT (pages 629-630, section 9.0).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Purnhagen et al. and Wang to determining the set of frequency coefficients using an FFT, because FFT's are an extremely efficient algorithm for determining frequency components of a signal, as taught by Oppenheim et al. (section 9.0).

7. Claims 9 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Purnhagen et al., in view of Wang, and further in view of Official Notice.

In regard to claims 9 and 26, Purnhagen et al. and Wang do not disclose the specific expression given in claim 9.

However, Official Notice is taken that the expression given in claim 9 is simply the standard sinusoidal model used in prior art systems (or an equivalent).
Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to use the specific expression given in claim 9 as an approximation of the transient audio signal, because sinusoidal expressions of a signal provide a very low bit rate representation of the signal.

8. Claims 10 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Purnhagen et al., in view of Wang, and further in view of Jain (U.S. Patent 4,935,963).

In regard to claims 10 and 27, Purnhagen et al. and Wang do not disclose determining an absolute value version of the transient audio signal x[n]; and

low-pass filtering the absolute value version to generate the approximate envelope.

Jain discloses a method for determining the envelope of a speech signal, comprising:

determining an absolute value version of the transient audio signal x[n] (pass through absolute value circuit, column 5, lines 7-9); and

low-pass filtering the absolute value version to generate the approximate envelope (a signal resembling the envelope of the signal, column 5, lines 15-20).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Purnhagen et al. and Wang to approximate the envelope by determining the absolute value of x[n] and low pass filtering, because an absolute value calculation and low pass filtering calculation are simple calculations that can be determined quickly without the need for determining the exact envelope of the signal x[n].

9. Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Purnhagen et al., in view of Wang, and further in view of Kleijn (U.S. Patent 5,884,253).

In regard to claim 14, Purnhagen et al. and Wang do not disclose scaling an energy level of the decoder approximation according to the scaling factor to match the energy level of the transient audio signal.

Kleijn discloses a method of decoding audio comprising scaling an energy level of the decoder approximation according to the scaling factor to match the energy level of the transient audio signal (a single scaling factor matches the energy of the reconstructed waveform to the original waveform, column 13, lines 36-42).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Purnhagen et al. and Wang to scale the energy level to match the original signal, because this would ensure the approximation more closely matched the original signal.

In regard to claim 18, Purnhagen et al. and Wang do not disclose the signal envelope estimator determines an energy-scaling factor.

Kleijn discloses a method of decoding audio comprising scaling an energy level of the decoder approximation according to the scaling factor to match the energy level of the transient audio signal (a single scaling factor matches the energy of the reconstructed waveform to the original waveform, column 13, lines 36-42).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Purnhagen et al. and Wang to determine a scaling factor, because this would ensure the approximation more closely matched the original signal.

Allowable Subject Matter

10. Claims 2, 4, 21, and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 2 and 21 both require "generating an <u>encoder</u> approximation of the transient audio signal based on the spline approximation". Purnhagen et al. generate a linear approximation of an envelope at the encoder side. While Wang discloses <u>reconstructing</u> an envelope based on a spline interpolation, there is no reasonable suggestion of performing a spline interpolation during encoding. Thus absent any teaching or suggestion in the prior art of record of generating an encoder approximation based on a spline approximation, claims 2 and 22 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 4 and 22 further limit claims 2 and 21, respectively, and thus would also be allowable.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Oomen et al. (U.S. Patent 6,925,434) disclose a method of parametric coding transient signals that utilizes an exponential envelope shape function to model the decay. Edler et al. (*ASAC*) disclose details of the envelope estimation used by Purnhagen et al. Le (*A Spline Smoothing Approach to Transient Signal Reconstruction*) discloses a method for modeling transients using a spline approximation. Huang (U.S. Patent 6,862,558) disclose a method that utilizes a cubic spline to approximate the envelope of an audio signal. Levine (U.S. Patent 6,266,644) discloses a method that sends an envelope parameter on transitions from non-transient to transient frames. Vafin et al. (U.S. Patent 7,020,615) disclose a method that relocates transients to a frame boundary before parametrically encoding the transients.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Albertalli whose telephone number is (571) 272-7616. The examiner can normally be reached on Mon - Fri, 8:00 AM - 5:30 PM, every second Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BLA 2/28/07

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